

AMENDMENTS TO THE CLAIMS

This listing of claims replaces all prior versions and listings of claims in the application.

Listing of Claims

1. (Currently Amended) In a radio communication system, a method of transmitting a signal, comprising the steps of:

feeding the signal to a plurality of antenna paths, wherein the signal includes a number of positions, each of the number of positions including a sample;

receiving the signal in each of the plurality of antenna paths;

for each antenna path, shifting the samples of the signal a predetermined direction and number of positions, wherein the predetermined direction and/or number of positions are different for at least two of the antenna paths, said shifting step including:

when shifting samples toward the end of the signal, shifting samples that are shifted beyond the number of positions in the signal into a corresponding number of positions at a beginning of the signal; and

when shifting samples toward the beginning of the signal, shifting samples that are shifted beyond the number of positions in the signal into a corresponding number of positions at the end of the signal;

in each antenna path, including a number of samples from the beginning or the end of the signal in a cyclic prefix; and

transmitting the signal and the cyclic prefix from each of the plurality of antenna paths in a first transmission attempt;

determining whether the signal needs to be retransmitted due to fading of the first transmission attempt;

if the signal needs to be retransmitted, shifting the samples of the signal in each antenna path a different predetermined direction and/or number of positions than were utilized in the first transmission attempt;

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in each antenna path, including a different number of samples from the beginning or the end of the signal in a new cyclic prefix; and

retransmitting the signal and the new cyclic prefix from each of the plurality of antenna paths in a second transmission attempt.

2. (Currently Amended) The method of claim 1, wherein the predetermined number of positions utilized in the first transmission attempt corresponds to a position of the antenna path with respect to the number of antenna paths.

3. (Currently Amended) ~~The method of claim 1, wherein~~ In a radio communication system, a method of transmitting a signal, comprising the steps of:

feeding the signal to a plurality of antenna paths, wherein the signal includes a number of positions, each of the number of positions including a sample;

receiving the signal in each of the plurality of antenna paths;

for each antenna path, shifting the samples of the signal a predetermined direction and number of positions, wherein the predetermined direction and/or number of positions are different for at least two of the antenna paths, and the predetermined number of positions corresponds to whether the signal is being retransmitted, said shifting step including:

when shifting samples toward the end of the signal, shifting samples that are shifted beyond the number of positions in the signal into a corresponding number of positions at a beginning of the signal; and

when shifting samples toward the beginning of the signal, shifting samples that are shifted beyond the number of positions in the signal into a corresponding number of positions at the end of the signal;

in each antenna path, including a number of samples from the beginning or the end of the signal in a cyclic prefix; and

transmitting the signal and the cyclic prefix from each of the plurality of antenna paths.

4-5. (Canceled)

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6. (Original) The method of claim 1, wherein the signal is an orthogonal frequency division multiplexed symbol.

7. (Canceled)

8. (Original) The method of claim 1, further comprising the steps of:
applying error protection coding to the signal;

interleaving the samples, wherein the samples are interleaved such that after de-interleaving, subcarriers with a lowest correlation are placed in positions next to each other;

performing an inverse fast Fourier transform on the interleaved coded symbols to form a resultant signal; and

providing the resultant signal to each of the antenna paths.

9. (Original) The method of claim 1, further comprising the steps of:
performing an inverse fast Fourier transform on the signal; and
attenuating the signal in each antenna path.

10-11. (Canceled)

12. (Currently Amended) An apparatus for transmitting signals comprising:
an input for receiving a signal to be transmitted, wherein the signal to be transmitted includes a number of positions, each of the number of positions including a sample;

a first antenna path; and

a second antenna path, wherein the second antenna path shifts the samples of the signal a predetermined number of positions, wherein samples shifted beyond the number of positions in the signal are shifted the predetermined number of positions into a beginning or an end of the signal;

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a transmitter for transmitting the signal from the first antenna path and the shifted signal from the second antenna path in a first transmission attempt; and

means for determining whether the signal needs to be retransmitted due to fading of the first transmission attempt;

wherein, in response to a determination that the signal needs to be retransmitted, the second antenna path shifts the samples of the signal a different number of positions than were utilized in the first transmission attempt, and the transmitter retransmits the signal from the first antenna path and the differently shifted signal from the second antenna path in a second transmission attempt.

13. (Original) The apparatus of claim 12, further comprising:

a third antenna path, wherein the third antenna path shifts the samples of the signal another predetermined number of positions,

wherein samples shifted beyond the number of positions in the signal are shifted the another predetermined number of positions into a beginning or an end of the signal.

14. (Original) The apparatus of claim 13, wherein the predetermined number of positions corresponds to a position of the second antenna path with respect to the first and third antenna paths and the another predetermined number of positions corresponds to a position of the third antenna path with respect to the first and second antenna paths.

15. (Original) The apparatus of claim 12, wherein the samples are shifted toward the end of the signal and wherein samples shifted beyond the end of the signal are shifted into the beginning of the signal.

16. (Original) The apparatus of claim 12, wherein the samples are shifted toward the beginning of the signal and wherein samples shifted beyond the beginning of the signal are shifted into the end of the signal.

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17. (Original) The apparatus of claim 12, further comprising:
means for applying an error correction code to signal; and
an interleaver.

18. (Original) The apparatus of claim 12, wherein the first and second antenna paths include means for adding a guard interval to the signal in the respective antenna path prior to transmission of the signal from each antenna path.

19. (Original) The apparatus of claim 18, wherein the guard interval is added to the beginning of the signal.

20. (Original) The apparatus of claim 18, wherein the guard interval is added to the end of the signal.

21. (Currently Amended) A radio ~~transmission~~ communication system comprising:

~~a transmitter~~ transmission portion including:

an input for receiving a signal to be transmitted, wherein the signal to be transmitted includes a number of positions, each of the number of positions including a sample;

a first antenna path; and

a second antenna path, wherein the second antenna path shifts the samples of the signal a predetermined number of positions, wherein samples shifted beyond the number of positions in the signal are shifted the predetermined number of positions into a beginning or an end of the signal; and

a transmitter for transmitting the signal from the first antenna path and the shifted signal from the second antenna path in a first transmission attempt; and

~~a receiver~~ receiving portion including:

a receiver that includes a first and second antenna path, wherein the receiver performs a signal quality enhancing combining using enhances signal quality by combining signals received on the first and second antenna paths of the receiver;

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means for reporting to the transmission portion whether the signal needs to be retransmitted due to fading of the first transmission attempt;

wherein, in response to receiving a report that the signal needs to be retransmitted, the second antenna path shifts the samples of the signal a different number of positions than were utilized in the first transmission attempt, and the transmitter retransmits the signal from the first antenna path and the differently shifted signal from the second antenna path in a second transmission attempt.

22. (Original) The system of claim 21, wherein the samples are shifted toward the end of the signal and wherein samples shifted beyond the end of the signal are shifted into the beginning of the signal.

23. (Original) The system of claim 21, wherein the samples are shifted toward the beginning of the signal and wherein samples shifted beyond the beginning of the signal are shifted into the end of the signal.

24. (Original) The system of claim 21, wherein
the transmitter further includes
means for performing an inverse fast Fourier transform; and
means for adding a prefix to the signal in each antenna path; and
the receiver further includes
means for removing the prefix; and
means for performing a fast Fourier transform.

25. (Original) The system of claim 21 wherein
the transmitter further includes
means for applying error protection coding to the signal to form coded symbols; and
means for interleaving the coded symbols;
the receiver further includes
means for removing de-interleaving received subcarriers; and

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means for decoding the de-interleaved subcarriers,
wherein the coded symbols are interleaved such that after de-interleaving,
subcarriers with a lowest correlation are placed in positions next to each other.

26. (Original) The system of claim 21, wherein the signal quality enhancing combining is a maximum ratio combining.

27. (Canceled)